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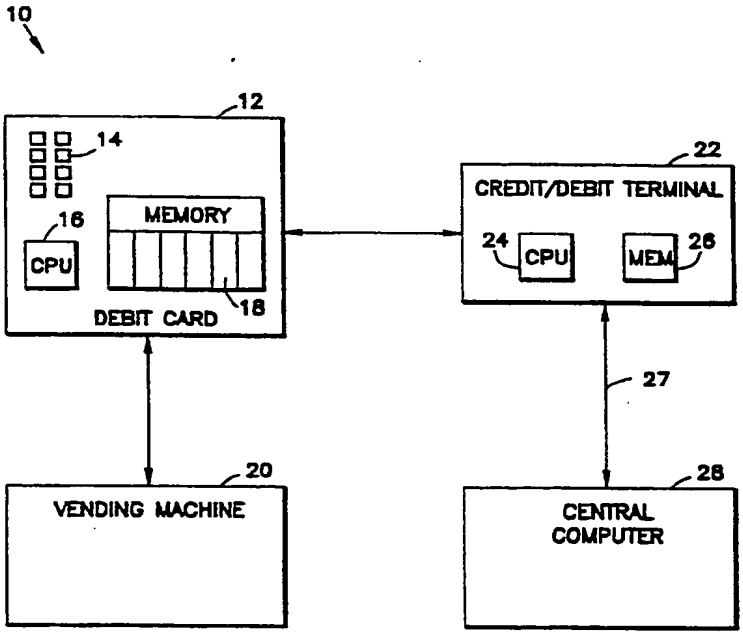

(57) Abstract

A debit card (12), including a microcomputer (16). The microcomputer (16) is programmed such that a plurality of memory zones are available with differing levels of accessibility to each of the zones. Funds may be transferred from an external source into the zones, or funds may be transferred from zone to zone.

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MICROCOMPUTER DEBIT CARD

Field of the Invention

The present invention relates to debit cards, and more particularly, to a debit card having a first protected account having restricted access and a second unprotected account having less restricted access.

Background of the Invention

The present invention relates to a debit card apparatus and the method for programming the same. More particularly, the present invention relates to a debit card apparatus and a method for programming the same to be used in applications where funds must be transferred routinely.

The debit cards are substantially flat, thin plastic articles, such as credit cards, bank cards, drivers licenses, membership cards, etc., currently in widespread use. Recently, manufacturers of these cards have provided such cards with their own integrated circuit or their own microcomputer. The debit cards may contain the same external qualities of the credit card, including the magnetic stripe, photo ID, printing, and embossing.

A debit card contains one or more integrated circuits (IC) chips. The chips provide microprocessing, memory, and an input/output capability. The memory in most types of debit cards has a nonvolatile property found in some of the best hand-held calculators. This nonvolatile memory remembers stored data without a constant power supply. The size of the memory in microcomputers continues to increase as technology evolves.

The combination of credit-card size, nonvolatile memory, and computer chip provides a unique set of features that open new doors for solving old problems. These new qualities are dependable security, reliable off-line data storage, and microcomputer power.

Uses for cards comprising microcomputers include

documenting an individual's entire medical history, financial information, etc. Furthermore, such cards may be used to automatically debit one's bank account when purchasing such items such as groceries, clothes, etc. One use of debit cards with microcomputers that has been discussed frequently, but has yet to be applied in a commercially-viable manner, is the use of microcomputer debit cards in the food service and vending industries.

The food service and vending industries are more competitive than ever. These industries are in search of ways to attract new customers and to reduce operational costs. One primary way to reduce operational costs is to reduce the costs of cash handling and labor costs.

A first generation of debit card systems provided some relief and promise to the food service and vending industries. Debit cards were credited with an initial amount and, with every transaction, the cards were debited with the price of the purchase. It was reduction of coin handling and the speed-up of checkout services.

However, the first generation of debit cards had certain limits that restricted their success in many markets. The early debit cards had limited card storage, were relatively easy to forge, and had a high dependence on central computers.

There is a need for a debit card that has a high degree of security, may be quickly accessed by a terminal, and provides minimal risk of loss of funds. In addition, there is a need for a debit card which could be readily adapted to different applications as they arise. The present invention solves this problem and many other problems associated with debit cards.

Summary of the Invention

The present invention relates to a debit card having two accounts. A first protected account having

restricted access and a second account having less restricted access.

In one embodiment, access to the restricted account requires use of a personal identifier number (PIN) whereas access to the second account does not require use of a PIN.

In one embodiment, the second account is accessible by a vending machine having an appropriate access key or access code.

In one embodiment, the present invention relates to a debit card apparatus, including a microcomputer. Memory in the microcomputer is programmed to include a plurality of zones. A first zone has a more restricted access than a second zone. There is a funds transfer means for transferring a funds amount from an external source into an account field of at least one of the zones. The funds transfer means may also transfer a funds amount from an account field of one zone to the account field of another zone.

A particularly advantageous feature of the present invention is that use of the debit card enables rapid transaction and debiting of an account. More specifically, in the food service and vending industries, the present invention allows a user to quickly choose a menu item, have an account debited, and receive the card and the food item back.

The present invention provides a debit card with a first protected account in a first memory zone that is accessible only by a personal identification number and a second unprotected account in a second memory zone that is accessible without a personal identification number. There are other memory zones which are separate and distinct and may share access to either the first or second memory zone.

Other memory zones may be included in the microcomputer. A third zone may have the lowest access restrictions. A fourth zone may be merely a record zone

to record transaction data. A common data zone including data common to various transactions may be included. This memory would be accessible for reading by the various application terminals.

The preferred embodiment of the present invention provides a safety feature such that an upper limit may be placed on the amount of funds that may be readily transferred from the debit card without a personal identification number. The user of the card programs an upper limit on funds available from the second account which is located in the second memory zone. Thus, a low upper limit may be set such that if the card is lost or stolen, the user could potentially lose a minimal amount in the unprotected zone. The safety feature occurs with the fact that the amount of funds available in the first protected account of the first protected memory zone, which are usually greater than the amount in the unprotected zone, would remain protected, except by a user with knowledge of the card's personal identification number.

Additionally, the present invention provides a debit card with a built-in security time lapse feature in case the card is lost or stolen. Funds in the protected zone may be set to automatically lapse after a predetermined time of nonuse of the card. This feature protects both the user and the debit card vendor.

The benefits to the customer of the present invention are numerous. The customer has more purchase convenience and can carry less change and make change less often. The customer can budget funds by placing a specific amount on the debit card at the beginning of each budget cycle. The present card offers more security than cash. The present invention offers a protected account on the card that can only be accessed with a personal identification number or other such identification means. If the card is lost or stolen, the protected account cannot be accessed without the

personal identification number. Also, vendors may offer bonuses and awards to the card holder based on the number of transactions or level of deposits. These bonuses are an added incentive for the customer to use the debit card.

These and various other advantages and features of novelty which characterize the invention are pointed out with particularity in the claims annexed hereto and forming a part hereof. However, for better understanding of the invention, its advantages, and objects obtained by its use, reference should be made to the drawings which form a further part hereof and to the accompanying descriptive matter in which there is illustrated and described a preferred embodiment of the invention.

Brief Description of the Drawings

In the drawings, in which like reference numerals and letters indicate corresponding parts throughout the several views;

Figure 1 is a schematic drawing of a debit card system of the present invention;

Figure 2 is a diagrammatic view of the memory zone of a debit card of the present invention;

Figure 3 is a diagrammatic view of the access keys to the memory zones of the present invention;

Figure 4 is a flow diagram of the debit card of the present invention being utilized in a transaction terminal; and

Figure 5 is a flow diagram of the debit card of the present invention being used in a vending machine.

Detailed Description of the Preferred Embodiment

Generally, a debit card will be issued by a vendor of a product or service to a user. The user will have certain information programmed into the debit card via a terminal. There will be, in the narrowest sense, two

zones of memory in the microcomputer of the debit card. The types of memory may be ROM, EPROM, EEPROM, RAM, to name a few. One zone, a first protected zone includes a first protected account field which allows the user to store an unlimited amount of monetary funds in the first account field on the debit card. The protected account field is only accessible through some sort of identifier, such as a personal identification number. The second zone is an unprotected zone. The second unprotected memory zone also stores a monetary amount of funds in a second account field having less restricted access. Generally, the unprotected account will have a maximum amount of funds which could be set by the user. As the user utilizes the debit card for products or services, a terminal debits the amount from the second account in the unprotected zone. As a balance of the unprotected account diminishes, the user may choose from an external source, or internally from the protected zone to the unprotected zone. If the user chooses to transfer funds from the protected zone to the unprotected zone, the user must input some identifier, such as a personal identification number, into the terminal to access the protected funds. In this manner, if the debit card is lost or stolen, the only funds available to a finder or thief or a card are the funds in the unprotected zone. Thus, the user of the card has limited liability in carrying such a card.

A debit card system 10 in accordance with the principles of the present invention is shown in Figure 1. It will be appreciated that numerous other debit card systems 10 will also be in keeping with the principles of the present invention and that this system is but one embodiment of such a system. In the system shown, a debit card 12, which might generically be referred to as a smart card or integrated circuit (IC) card, is shown with external contacts 14 electrically interconnected to one or more integrated circuits (IC)

embedded in the card 12. The integrated circuits include a central processor unit (CPU) 16, reusable nonvolatile memory 189, and an input/output capability. The size of the memory can vary with a range of 256 to 2000 being preferred. Of course as more memory is made available, additional applications and functions can be added to the debit card 12. The debit card 12 will preferably use a standard ISO format for its interface function with other intelligent sites. In addition to its integrated circuits, the debit card 12 may include external features typically present on credit cards, cash cards, identification cards, etc. These features might include a magnetic stripe having information magnetically stored thereon, a photo identifier, printed information, embossed information, etc. The debit card 12 shown is preferably pocket sized; e.g., roughly the size of a standard credit card. Its carrier material might be the same type of plastic card stock used for credit cards. While the embodiment of the debit card 12 shown does not include a display, keypad, and battery, other embodiments of the debit card 12 might include a display, keypad, and/or battery and still be in keeping with the principles of the present invention.

In the system shown, the debit card 12 is shown as being used with a vending machine 20 and a credit/debit terminal 22. Use of the debit card 12 with the vending machine 20 allows the user to purchase a menu selection from the vending machine 20. The credit/debit terminal 22 shown allows the user to transfer funds in and out of the debit card 12, as well as from memory zone to memory zone within the debit card 12. The credit/debit terminal shown has a CPU 24, associated memory 256 and interfaces with a remote central computer 28. The interconnection between the credit/debit terminal 22 might be accomplished by any number of ways; e.g., conventional telephone lines 27 as shown, dedicated lines, wireless transmission, etc. The central computer

28 will typically be under control of the card issuer or vendor. In some systems, there may not be an interconnection with a remote computer, so that the debit card 12 is used without the user ever accessing a remote central computer.

The vending machine 20 and the credit/debit terminal 22 will include a debit card receptor device and a debit card read/write device for accepting the debit card 12 and reading/writing information from and to the memory of the debit card 12. The read/write device will include electronics to power the smart integrated circuits of the debit card 12 and to perform the read/write of the debit card 12. The receptor device will interface with the vending machine dispenser controls in a conventional manner. The vending machine 20 might include an optional bill acceptor thereby enabling operation of the vending machine 20 by use of cash or the debit card 12. A display, which will preferably be an integrated part of the vending machine 20 and the credit/debit terminal 22, will display card data and menu selection. A touch sensitive key pad will preferably be present to enable operator selection of the menu items.

The debit card 12 of the present invention provides security at two basic levels, physical and access control. Physical security protects against forgery or duplication of the card contents. Access control addresses the issue of cardholder confirmation; i.e., confirming that the cardholder the person using the card. Access control also protects the system from accidental or deliberate attempts to access privileged functions or data. The debit card 12 includes intelligence for dividing its memory into protected zones or areas that are inaccessible to the system and cardholder. These memory zones would be utilized by the card issuer. The debit card 12 further include intelligence for limiting access down to the field

level. For example, there may be only certain fields within a memory zone which are accessible to a user. Zones may be shared by applications, e.g., there may be subzones set up within a given memory zone with each subzone being assigned to a different vendor. It will be appreciated that the debit card may take on numerous variations in its design.

Diagrammatically illustrated in Figure 2 is a schematic flow diagram of schematic organization of an embodiment of microcomputer memory 30 of the present invention. There is a common data zone 32. There is a food service application protected memory zone 34. There is a vending application unprotected memory zone 36. There is a shared food service application protected memory zone 38. There is a shared vending application unprotected memory zone 46. There is an access application memory zone 42, and a transaction record zone 44. Funds may be transferred from the first protected account field of the food service application zone 34 to the second unprotected account field of the vending application zone 36. The transfers may flow in either direction between these two zones. The protected memory zone 34 requires some sort of user identification such as a personal identification number (PIN) to access the first protected account field of the protected memory zone 34. On the other hand, a general terminal which interfaces with a card may access second unprotected account field of the unprotected memory zone 36.

In the preferred embodiment, the debit card 12 will include a plurality of memory zones having different fields of information. The memory zones of one embodiment will now be discussed.

Zone 0

The common data zone 32 is one of many zones envisioned in the present invention. The purpose of the

common data zone is to provide the user with a recognizable salutation when he or she inserts the debit card into a card reader system. One possible field in the common data zone is the service company who is issuing the card or is responsible for the terminal on which the debit card is being used. This would typically be the food service or the vending service company. There also might be a field identifying the card as a debit card. Another field would be a service site code. The service site code would relate to the user, the service company, and the site where the user is presently using the card.

Other fields which may be included in the common data zone are the cardholder's name, cardholder's ID, cardholder's birthday, cardholder's anniversary with the company, and the cardholder's gender. These fields would be displayed on the screen when the cardholder inserts the card. These features tend to make the card user friendly and also make it easy for the finder of the lost card to identify the identity of the user.

Service Application Protected Zone

In the embodiment shown, the protected memory zone including the protected account field is a food service application zone 34. Food service companies would likely be the issuer of such cards. This memory zone is accessible by the food service terminals having the appropriate access key.

There are many fields that may be encompassed in the food service application protected memory zone. The protected account field in this memory zone is unaccessible to all persons not knowing the user's personal identification number or any other identifiers which may be used in conjunction with the debit card. Each issuer of the card also has access to this from an application's viewpoint. There are many methods whereby funds may be transferred into the protected account

field of the service application protected zone. Possible fields for this transfer include payroll deduction plans and cash/change machines, wherein cash or change may be inserted into a terminal and recorded thereafter in the protected account of the service application protected zone.

Fields may be set up which allow the user to borrow against the service application protected memory zone such that IOU's are recorded. There also may be a maximum amount specified for the unprotected account field.

A drop-dead data field may be implemented into the service application protected memory zone. The purpose of the drop-dead data field is to disable the card after a predetermined length of time. After a designated period of nonuse elapses, that amount of funds in the protected zone of the card becomes unavailable through the user of the card. This protects both the user and the issuer of the card. If the user were to lose the card and the period of time elapsed, the card would become useless to anyone attempting to use the debit card. Furthermore, this feature protects the issuer of the card from reimbursing a user who claimed the card was stolen, but later finds that the user uses the card after reimbursement from the issuer of the card. This feature allows the issuer of the card to wait until the period of nonuse occurs before reimbursing the user. After this period, the card becomes useless.

Other fields that might be included within the protected zone are maximum advances per month, month of last advance, month advance this month, amount in protected area, total amount of non-vending purchases, total number of non-vending purchases, and date of last vending purchase. All these values may be used to monitor the user's use of the debit card.

Promotional programs may be set up such that if the user frequents a specific terminal, transfers a certain

amount of funds, or buys certain products, the user may get a specified percentage discount. The possibilities are infinite.

Vending Application Unprotected Zone

In the embodiment shown, the unprotected memory zone including the unprotected account field is a vending application zone 36. The vending application unprotected zone 36 is readily accessible for vending applications. In a typical use, the user would insert the debit card into a vending machine and would choose an item to purchase. The purchase price of the item would be debited against the user's amount in the unprotected zone.

Fields or possible fields included in the unprotected zone are the amount in the unprotected account, the total amount of vending purchases for a specified period of time, total number of vending purchases over a specified period of time, and the date of the last vending purchase.

A useful field in the unprotected zone would allow a user to select a maximum amount that he or she would be comfortable with in the unprotected zone. This is the amount that the user would be willing to possibly lose if the card was stolen. There might be some users who would choose a low maximum amount. These users would minimize the amount lost when a card was stolen. Other users may set a rather high maximum amount such that they need not transfer money from either an external source or the protected zone into the unprotected zone so frequently. This feature allows the user grater flexibility in the use of the debit card.

Shared Protected Application Zone

In the embodiment shown, there is a third memory zone 38 referred to as the shared protected application zone. The shared protected application zone 38 allows

the debit card to be used in more than one set of terminals or applications. The original issuer of the debit card would provide a second party with a format code key which accesses the shared protected zone 38 and which in turn provides the access key to the protected memory zone. This would allow the second vendor of services or products to use a debit card in the same manner as the original issuer of the card, but may use it for entirely different services. Multiple applications could be used in each card. In addition to the preferred food service industry, other services, such as check cashing, health care, ticket purchasing, equipment checkout, and building access are among the few that could be implemented into the present invention. Additional shared protection application zones 46 might be present.

The original issuer of the card could, thus, license out the use of other shared protected application zones. This "licensing" would also minimize the number of cards that a user would have to carry.

Shared Vending Application Unprotected Zone

A fourth memory zone, the shared vending application unprotected zone 40, similar to the shared protected application zone, may be formatted for a different use. The issuer of the card provides a third vendor of services or products with a format key for accessing the shared unprotected zone which in turn provides access to the unprotected zone such that the funds in the unprotected account may be accessed for various applications. The third vendor may then provide an application, such as vending applications, such that the user may use the debit card in the third vendor's vending machines. The third party would have access to the amount in the unprotected zone, but would not have access to the amount in the protected zone. This would allow the original issuer of the card to license access

to the unprotected zone to many vendors, thus, providing a wide array of choices to the card user while also promoting the growth of the vending service industry. There could be numerous shared unprotected zones 48 in the debit card.

Access Application Zone

In the embodiment shown, there is an access application memory zone 42 which comprises fields which allow access to a restricted area. The fields include the access data requiring a personal identification entry number, as well as a field that allows data to be shifted. Restricted building access is one application in the preferred embodiment.

Transaction Record Zone

A transaction record zone 44 provides a zone with fields that record transaction data. The transaction data recorded could include the time/date of a transaction, the terminal identification, transaction codes, the amount of transaction, the unprotected balance, and a completion code. The time/date field could be divided into subfields into seconds, minutes, hours, days, months, or years. Number of fields in the transaction record zone are unlimited with any data necessary to the vendor being recorded.

Figure 3 is a memory key table. The memory zones require a key to access the memory zones. The key is known to the issuer of the cards. The terminal or vending machine in which the debit card is being used must supply the associated key e.g., A2, before the debit card would allow access to, e.g., the vending protected zone. Upon receipt of the key the microcomputer of the debit and 12 will locate the appropriate zone by use of its memory key table. It is envisioned ther could be memory zones accessible by more than a key, or the same key may access more than

memory.

Figure 4 is a flow diagram describing the events occurring at a transaction terminal. A card user inserts a card in a transaction terminal. The card user must enter a personal identification number. The card user has a choice whether to transfer funds to the first protected account from an external source or transfer funds from the first protected account to the second unprotected account. If the user chooses to transfer funds from an external source, the external source must be designated. Possible external sources of funds may be cash, payroll deductions, bank savings, checking accounts, credit cards, etc. The amount to be transferred must be less than or equal to the amount available in the external source. If it satisfies this criteria, the transfer is made into the first protected account of the first protected zone and the balance is displayed. If there are insufficient funds, the transaction terminal will not allow the transfer and an alert signal will be displayed on the terminal.

If the funds are to be transferred from the first protected account to the unprotected account of the second zone, the amount to be transferred must be less than or equal to the amount available in the first zone. The amount is then transferred to the second zone. If the amount to be transferred is greater than the second zone's maximum limit, the transaction terminal will not allow the transfer to take place and the alert display will occur on the terminal. If the transaction does not exceed the maximum limit, funds will be transferred and remaining balances of the first and second zones will be displayed on the terminal. The user then exits the transaction terminal.

Figure 5 is a flow diagram describing the events occurring in a vending application. The user inserts a debit card into the vending machine and selects a menu selection. The vending machine accesses the unprotected

account of the s cond memory zone to see if there are sufficient funds. If there are not sufficient funds, the transaction is not allowed. If there are sufficient funds, the unprotected account of the second zone is debited with the amount of the transaction, and the user receives the debit card back.

There are many characteristics of the present invention that provide versatility and flexibility in the card. The debit card of the present invention is designed for application expansion. Through the use of the shared zones, multiple applications may share one card in a secure manner. Multiple applications may be integrated or have no access to the other applications. If desired, generic debit cards of the present invention with no photo ID or customer-printed names may be issued. These cards may be reused by other customers. Recalled cards may be reformatted and issued to new customers. These types of generic debit cards are appropriate for student meal cards, temporary employee cafeteria cards, or general issue vending cards.

It is to be understood that even though the above numerous characteristics and advantages of the invention have been set forth in the foregoing description, together with the details of the structure, function of the invention, the disclosure is illustrative only, and changes may be made in detail, especially in matters of shape, size and arrangements of parts within the principles of the invention to the full extent indicated by the broad general meaning of the terms in which the appended claims are expressed.

WHAT IS CLAIMED IS:

1. A method for making a debit card, including a microcomputer, the method comprising:

(a) programming the microcomputer to comprise a plurality of distinct memory zones, first account field of a first memory zone having more restricted access than a second account field of a second memory zone; and

(b) programming the microcomputer to transfer funds from an external source into at least one of the zones and to transfer funds form the first zone to the second zone.

2. A method in accordance with claim 1, including the steps of programming the microcomputer so that the account field of the first memory zone is accessible with a personal identification number.

3. A method in accordance with claim 1, further including the steps of programming the microcomputer to comprise a third memory zone having a less restrictive access than the second memory zone.

4. A method in accordance with claim 1, further including the steps of programming the microcomputer to comprise a plurality of separate and distinct memory subzones of the first memory zone.

5. A method in accordance with claim 1, further including the steps of programming the microcomputer to comprise a plurality of separate and distinct memory subzones of the second memory zone.

6. A method in accordance with claim 1, further including the steps of programming the microcomputer to comprise a fourth zone for the purpose of recording

data.

7. A method in accordance with claim 1, further including the steps of programming the microcomputer such that the user may program an upper limit on funds available from the second account field zone.

8. A method in accordance with claim 1, further including the steps of programming the microcomputer such that a time interval may be programmed into the protected zone, such that after the time interval has elapsed, remaining funds in the first account field become unaccessible through the use of the card.

9. A debit card having a microcomputer and memory, comprising:

(a) a plurality of distinct memory zones;

(b) a first account field of a first protected memory zone having a more restrictive accessibility than an account field of a second unprotected memory zone;

(c) funds transfer means for transferring funds from an external source into at least one of the account fields of one of the memory zones and for transferring funds from memory zone to zone.

10. A debit card in accordance with claim 9, wherein the first account field is accessible with a personal identification number.

11. A debit card in accordance with claim 9, wherein there is a third memory zone having a less restrictive access than the second memory zone.

12. A debit cad in accordance with claim 9, wherein there is a plurality of separate and distinct first protected memory sub-zones.

13. A debit card in accordance with claim 9, wherein there is a plurality of separate and distinct unprotected second memory zones.

14. A debit card in accordance with claim 9, wherein there is a fourth memory zone recording data.

15. A debit card in accordance with claim 9, wherein the user may program an upper limit on funds available form the second account field.

16. A debit card in accordance with claim 9, wherein a time value may be programmed into the unprotected memory zone, such that after the time value has elapsed, remaining funds in the first account field become unaccessible through the use of the card.

17. A vending method comprising the steps of:

(a) inserting a debit card with a microcomputer memory into a vending machine, the debit card comprising:

(i) a plurality of distinct memory zones;

(ii) a first memory zone having an account field with more restrictive accessibility than an account field of a second memory zone;

(b) selecting an article to be vended;

(c) comparing the account field balance in the second memory zone of the debit card with the price of the article to be vended; and

(d) debiting the account field balance if the price of the article is less than the account field balance.

18. A debit card, comprising:

(a) a debit card having a microcomputer and memory comprising:

(i) a first account field located in

memory having restricted access;

(ii) a second account field located in memory having less restricted access than the first account field; and

(b) electrical contact means providing electrical contact with an external device.

19. A debit card in accordance with claim 18, wherein access to the first account field is restricted to a specific user identifier.

20. A debit card in accordance with claim 19, wherein the second account field is accessible by an external device having a specific access code regardless of the user's user identifier.

21. A debit card in accordance with claim 20, wherein the first account field is located in a first memory zone accessible by a first access code.

22. A debit card in accordance with claim 21, wherein the second account field is located in a second memory zone accessible by a second access code separate and distinct from the first access code.

23. A debit card in accordance with claim 22, wherein the microcomputer includes means for transferring an amount from the first account field to the second account field.

24. A debit card in accordance with claim 23, further including a field identifying the date of the last activity with respect to the second account field.

25. A debit card in accordance with claim 24, further including means for comparing the elapsed time between the date of the last activity to the date of

next usage, and if this elapsed time exceeds a predetermined amount, disabling any further transactions relative to the first account field.

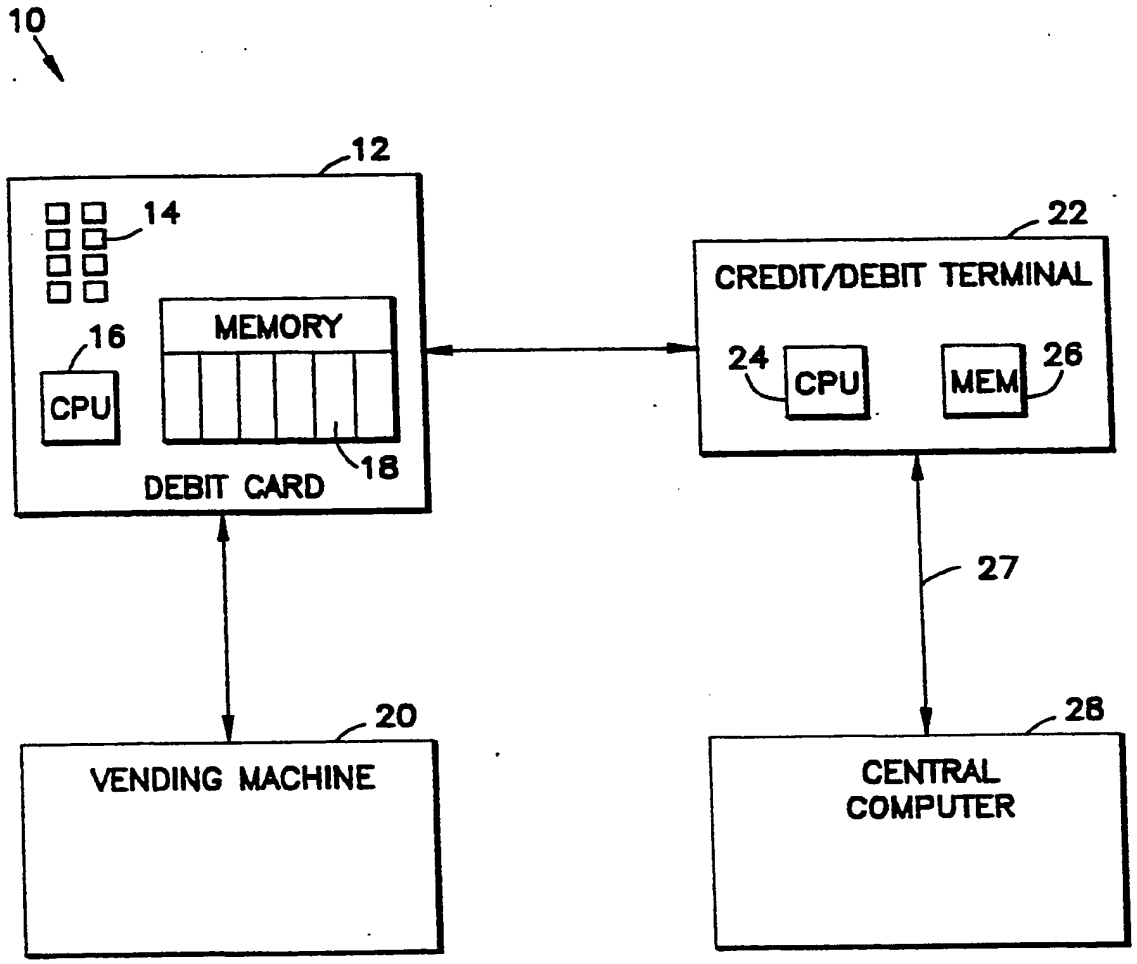
26. A debit card in accordance with claim 18, including a key code look up table in memory identifying memory zones associated with a specific access code.

27. A debit card in accordance with claim 26, wherein selected memory zones will include an access field containing the access code of another memory zone.

28. A debit card in accordance with claim 18, wherein the debit card includes printed and embossed indicia thereon.

29. A debit card in accordance with claim 18, wherein the debit card includes a display.

30. A debit card in accordance with claim 18, wherein the debit card includes a magnetic stripe.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24
CPU
MEM
26
27
20
VENDING MACHINE
28
CENTRAL COMPUTER

FIG. 1

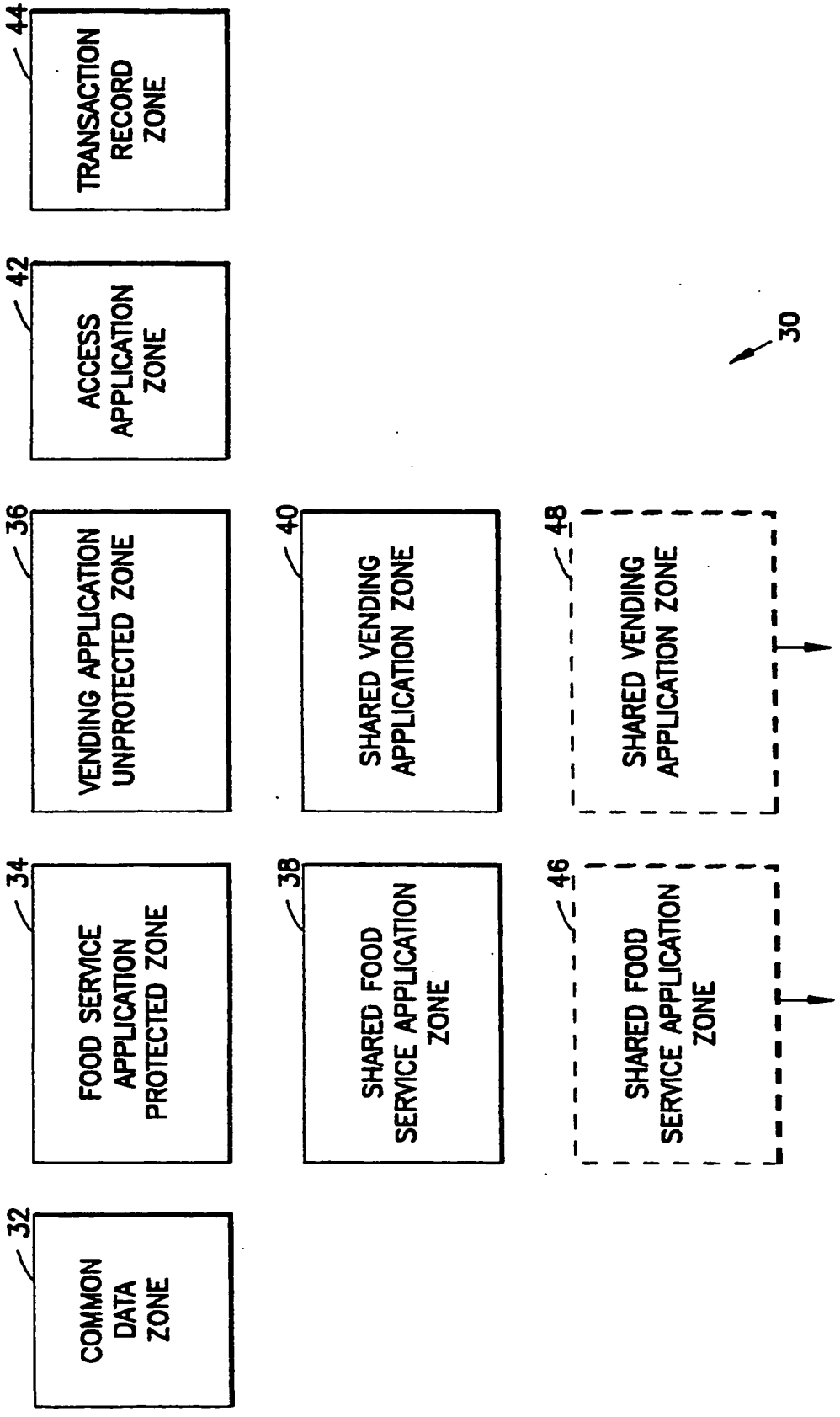

FIG. 2

A1	FOOD SERVICE PROTECTED MEMORY ZONE
A2	VENDING UNPROTECTED MEMORY ZONE
A3	SHARED FOOD SERVICE PROTECTED MEMORY ZONE
A4	SHARED VENDING UNPROTECTED MEMORY ZONE
A5	ACCESS KEY

FIG. 3

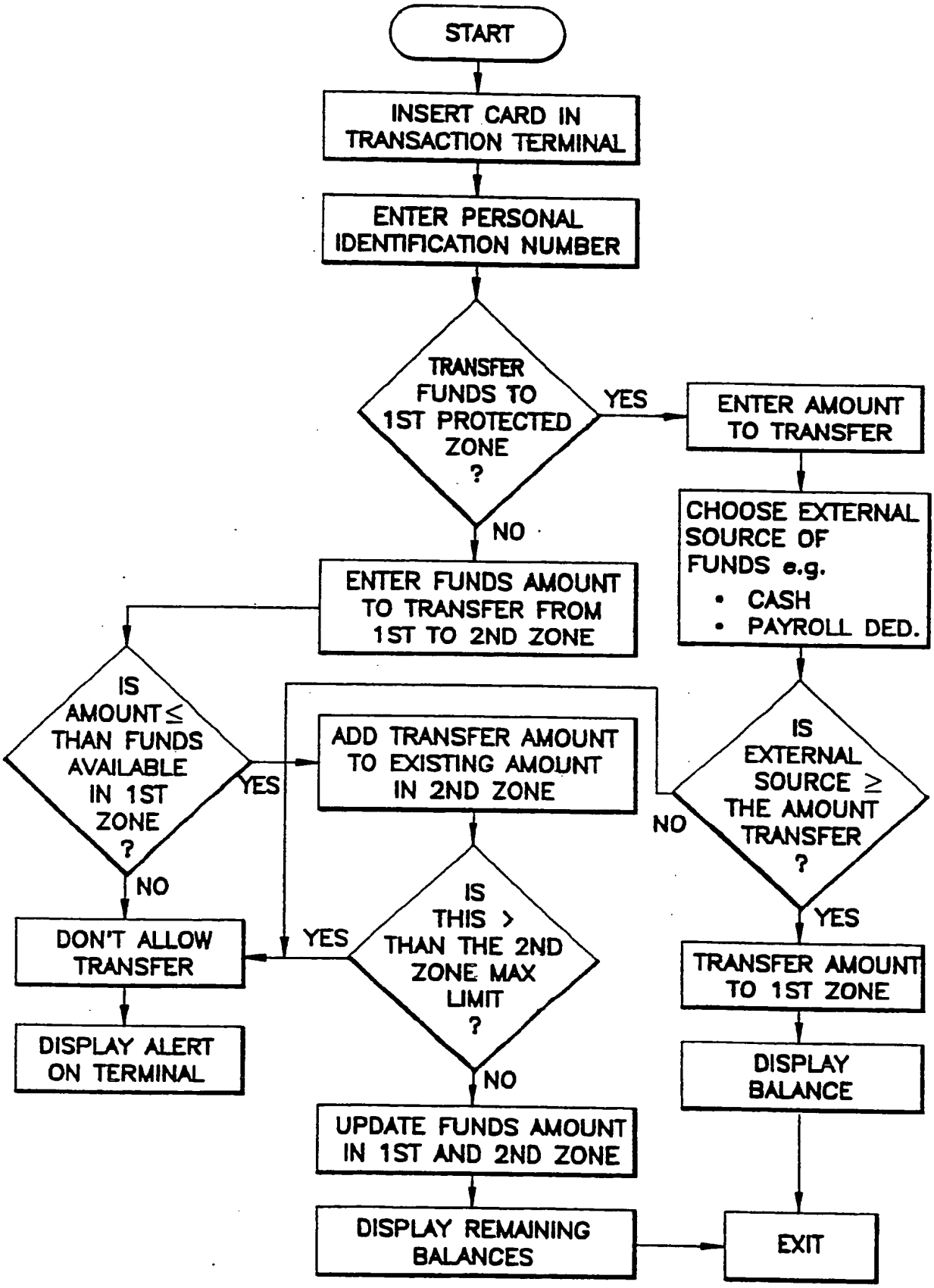

FIG. 4

SUBSTITUTE SHEET

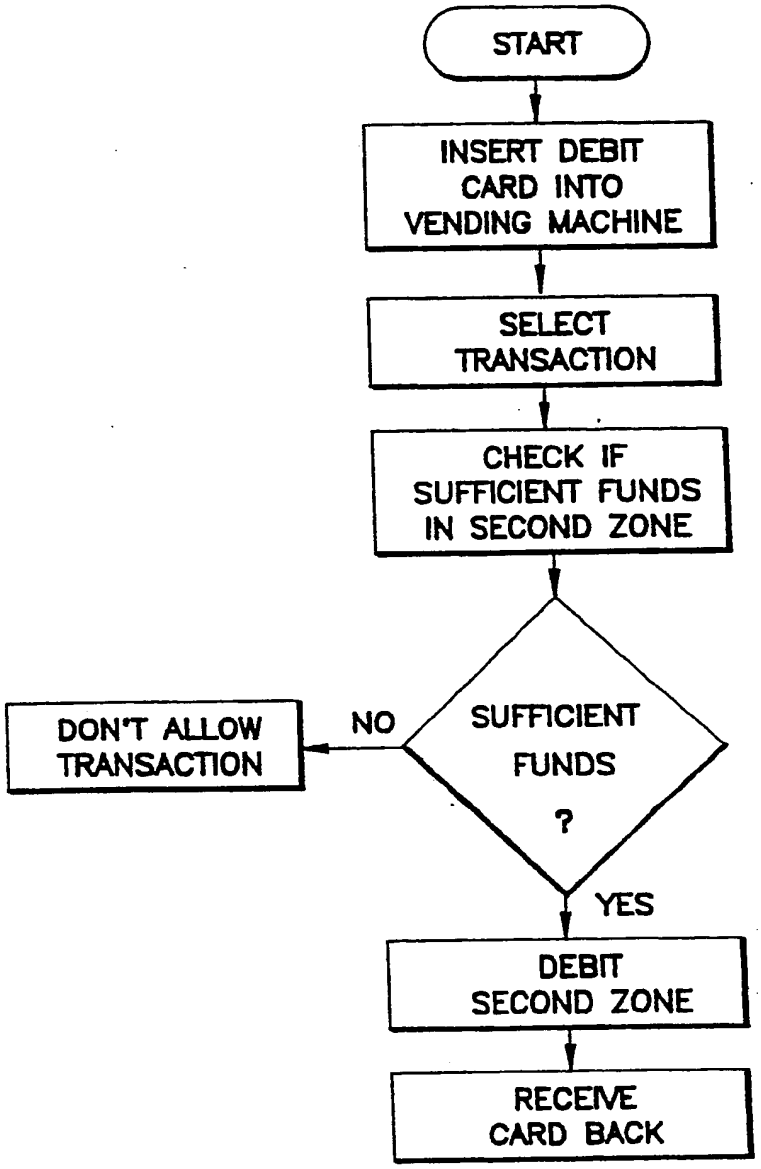

FIG. 5

INTERNATIONAL SEARCH REPORT

International Application No. PCT/US90/02592

I. CLASSIFICATI N OF SUBJECT MATTER (if several classification symbols apply, indicate all) [6]

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC (5) : G06F 7/06, G06K 19/073

U.S. Cl : 235/380,381,487,492

II. FIELDS SEARCHED

Minimum Documentation Searched [7]

Classification System	Classification Symbols
U.S.	235/380,381,487,492

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched [8]

III. DOCUMENTS CONSIDERED TO BE RELEVANT [9]

Category *	Citation of Document, [11] with indication, where appropriate, of the relevant passages [12]	Relevant to Claim No. [13]
Y	US,A 4,367,402 (GIRAUD ET AL) 4 January 1983 See entire document.	1-30
Y	US,A 4,256,955 (GIRAUD ET AL) 17 March 1981 See entire document.	1-30
Y	US,A 4,211,919 (UGON) 08 July 1980 See entire document.	1-30
Y	US,A 4,204,113 (GIRAUD ET AL) 20 May 1980 See entire document.	1-30
Y,P	US,A 4,882,474 (ANDERL ET AL) 21 November 1989 See entire document.	1-30
Y	US,A 3,697,729 (EDWARDS ET AL) 10 October 1972 See entire document.	8,25

* Special categories of cited documents: [10]

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
18 July 1990	15 AUG 1990
International Searching Authority	**Signature of Authorized Officer**
ISA/US	HAROLD PITTS

Form PCT/ISA/210 (second sheet) (Rev.11-87)